DECLARATION OF J. MICHAEL CASTILLO

I, J. Michael Castillo, hereby declare that:

1. I work as a private Forest Management Consultant with Hawaii Natural Resources Services, LLC (HNRS), based in Kamuela, Hawaii. I have served as the Principal Consultant with HNRS since its incorporation in 2003. Prior to HNRS, I worked as a Fish and Wildlife Biologist with the U.S. Fish and Wildlife Service, Division of Ecological Services, stationed in Honolulu from 1997 through 2001, and from 2001 to 2003 in Hilo. Prior to working for the U.S. Fish and Wildlife Service, I was employed by the Center for Ecological Management of Military Lands, based at Colorado State University, from 1990 to 1997. The organization is now named the Center for Environmental Management of Military Lands (CEMML). In 1997 I obtained a Masters of Science Degree from Colorado State University in Forest Sciences in the Degree program of Forest Ecosystem Management.

During my tenure with CEMML I fist worked as a Research Technician conducting rare plant surveys at the U.S. Army's Pohakuloa Training Area (PTA), then as a Research Assistant, mapping vegetation and rare plants and monitoring trends in endangered plant populations across the 110,000 acre PTA. During the later part of my tenure at CEMML I worked as a Research Associate leading field studies monitoring the effects of Wildfire on rare plants and conducting field research into methods to control and manage the highly invasive fountain grass (*Pennisetum setaceum*) in dry montane Hawaiian ecosystems. My 1997 Master's Thesis addressed the latter subject.

As a Fish and Wildlife Biologist, I worked on a range of short- and long-term assignments related to conservation and management of plants, vegetation, and habitat. Assigned geographically to Hawaii Island, I worked across 6 separate division programs implementing programs to promote the conservation and recovery of rare plant and animal species and their habitats. One of the programs that I spent a significant portion of my time on was the Interagency Cooperation program under which I participated in informal and formal Endangered Species Act Section 7 Consultations. Other programs included the Conservation Partnerships Program which administers cost-share programs with landowners to conserve rare species and habitats, and the Environmental Review program which provided information to project proponents regarding species locations and potential impacts of proposed projects.

As a consultant since 2003, I have provided consulting and management planning services to government agencies, private landowners, and community-based non-profit organizations. Services have included preparation of forest and watershed management plans, vegetation monitoring, ecological data synthesis, species surveys, grant administration, hazardous fuels reduction, and wildfire research project management. In the spring and fall of 2006 I instructed Forest Pest Management (AG275) and Agroforestry (AG175), respectively, within Hawaii Community College's Tropical Forest Ecosystem and Agroforestry Management Program, in Hilo and Kailua-Kona.

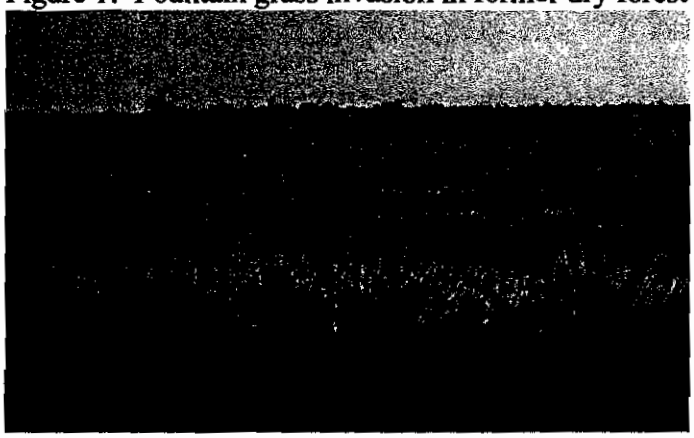
Since 2001, I have served as a member of several organizations focused on planning and implementing sound management practices to conserve and restore dryland forest ecosystems in Hawaii, including the Puu Wa'awa'a Advisory Council, the West Hawaii Wildfire Management Organization, the Hawaii Forest Industry Association, the Dry Forest Working Group, and the HCC Forest Team Advisory Board. Through this service I have maintain a management focus toward leeward dry forests of Hawaii island and raised funds to implement cooperative fuels management measures to reduce fire threats on state-managed lands adjacent to PTA on the west and southwest.

2. Pohakuloa Training Area occurs within a highly unique upland landscape that represents one of Hawaii's ecological jewels. Hawai'i's evolution as a high island archipelago isolated from continents and other major land masses of the world's provided for the development of the most highly endemic ecosystems. But, activities of humans and the effects of the species they have introduced have caused large-scale changes in the distribution and function of Hawaiian ecosystems, particularly in lowland environments.

Approximately half of the island archipelago is arid due to their leeward exposure to the predominant trade winds. Arid environments are among the worlds most endangered ecosystems, currently having been reduced by over 85%, particularly in low elevations. Dryland environments on tropical islands have been more heavily impacted by human activity and land uses than wet environments. These uses have been most concentrated in lowland areas below 3,000 ft, and in Hawai'i include clearing, intensive agriculture, logging, burning, grazing, and military use. The least disturbed and most intact dryland plant communities remaining in Hawai'i are in montane and subalpine environments limited to the islands of Maui and Hawai'i, of which the central region of Hawai'i island contains the majority.

Upland environments, such as those that occur at PTA, support the largest and most contiguous remaining native-dominated forest and shrubland. Alien grass-carried wildfire is the most pressing and wide-spread factor threatening the remaining upland dry forest ecosystem of Hawai'i. The area affected by wildfire at PTA and surrounding areas is growing due to the active spread of the invasive fountain grass (*Pennisetum setaceum*), a high loading fine fuel that carries most of the large fires in the region (figure 1).

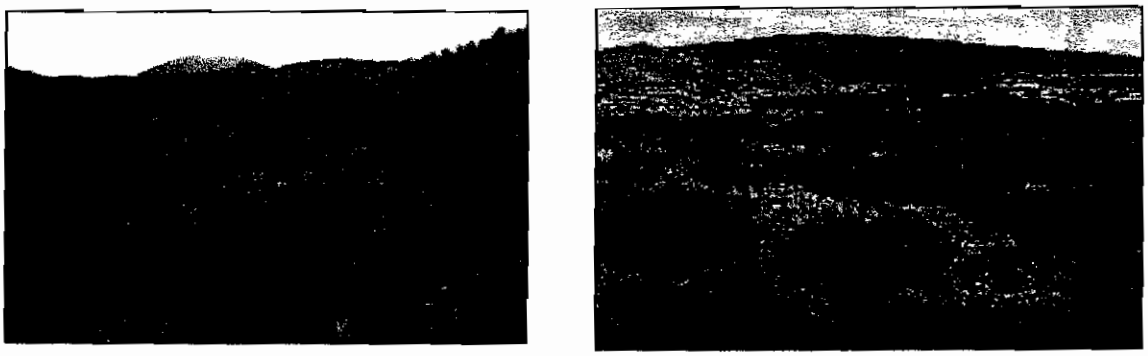
Figure 1. Fountain grass invasion in former dry forest west of PTA, 2005)



3. Due to Hawaii's unique evolutionary history and the extremely limited global extent of upper-elevation dry ecosystems, the 108,000 acres dry forest at Pohakuloa Training Area is very important in the global conservation of dry forests. The dry montane ʻŌhiʻa woodlands, Ākoko forest, Naio-mamane scrub, and Āʻaliʻi shrublands of the region in which Pohakuloa Training Area sits are unique and irreplaceable. The lowland dry forest that was once adjacent in the lands downslope in the State-managed Puu Anahulu Game Management Area are nearly gone due to the effects of alien-grass carried wildfires that have burned from below on regular intervals since the late 1960s. These fires, and training-ignited fires within and near to the impact area, and the combined impacts resulting from competition with fountain grass and browsing from feral sheep and goats, are additional factors that strain existing management programs beyond their capabilities.

PTA harbors unique and relatively high quality native ecosystems because military training has protected it from other more destructive land uses such as cattle production. But the fact that endangered species still remain on the installation, even in the Impact Area, is not because the species thrive or tolerate the impacts of heavy live fire and maneuver training, but is an artifact of recent biological resource inventories that discovered what are likely to be the last remaining populations of once common species persisting in dwindling habitat patches. This assertion is supported by population data for rare plant species at Pohakuloa, showing declines in the number of populations and total individuals of nearly every threatened and endangered plant species that occurs on the installation between 1993 and 2003. These species include *Asplenium fragile*(E), *Chamaecyse olowaluana*, *Haplostachys haplostachya (E)*, *Silene hawaiiense (T)*, *Silene lanceolata (E)*, *Stenogyne angustifolia* (E), *Tetramalopium arenarium* (E), *Zanthoxylum hawaiiense* (E), and others. It is also supported by visible reductions in distribution of native plant communities and increase in alien grassland throughout the impact area and northwestern, northern, and northeastern portions of the installation (Figure 2).

Figure 2. Former Native Dodonaea Mixed Shrubland supporting Silene lanceolata (extirpated) in the Kipuka Kalawamauna Rare Plants Habitat Area at 4,500 ft. elevation in northwestern PTA, 1993 (left), and alien grass invading Dodonaea Mixed Shrubland near Twin Puus, Pohakuloa training Area, 2005 (right).



4. The spread of fountain grass is continuing unabated and is not managed as a whole. From its current large stands that overlap into the impact area along the west, southwest, and northwest boundaries, the large stands spanning the Impact Area boundary in Ranges 11T, 10, 9, and 8, and from the rapidly growing new stand along the lower Pohakuloa Gulch north of the new Base Camp and Mauna Kea State Park, the species is likely to form nearly continuous stands throughout the western, northern, and eastern portions of the installation, including the northern half of the impact area where it is well established as a dominant species.

Based upon the continued spread of fountain grass across PTA and into surrounding environments, it is reasonable to expect the fire risk to . As the fire threat grows, so do the number of fires, the size of fires, the cost of fighting fires, the impacts to training, impacts and cost to infrastructure, loss of habitat and species, loss of soil, etc.

The fountain grass distribution is spreading across the young lavas to connect many of the pockets older wooded kipukas that have historically supported fountain grass and fire. This pattern of fountain grass spread throughout northern portions of the impact area is connecting target areas near Twin Puus and Range 17 in the northwest portion of the installation with large pockets of fountain grass in Ranges 13, 12, 11, 10, and 8. Former small pockets of fountain grass were allowed to burn without incident. However fuelbed conditions between these pockets are becoming more continuous and heavily loaded with grass fuels that carry larger fires into native forest areas. Stryker use will likely increase this effect due to increasing the abundance of ignition sources and fires throughout all of these ranges.

5. The most pressing resource management issue is the increasing risk from wildfire resulting from training and alien grass invasion throughout Pohakuloa Training Area and surrounding lands. At PTA most fires start from military training. Most of those fires are caused by tracers used in training (7.8.3.c). Northern and Western portions of PTA have greater fire risk due to heavy fuel loading, high amount of fountain grass, and dry weather conditions. Approximately ¾ of all fires at PTA started at Ranges 1,8,10,11, 12, and in the impact area. There is no firefighting in the impact area.

Existing measures to manage and reduce wildfire risk are narrow in scope, inadequate in scale, and have no record of proven effectiveness. Conservation measures to offset these impacts ought to include large-scale fuels management measures that manage alien grass spread across the installation. To be effective at that landscape-scale, the efforts to manage invasive species and wildfire risks should be collaborative, planned and implemented in cooperation with neighboring landowners. Specialized and intensive fuels management programs that strategically integrate large-scale fuels management measures with wildfire risk monitoring must be seamlessly coordinated with training exercises in order to be effective.

Intensive management measures need to be implemented diligently, strategically, and continually, to ensure the perpetuation of functional habitats able to support self-sustaining populations of naturally-occurring native plants and animals.

Impacts resulting from training can be direct, such as resulting from destruction from off-road wheeled and foot traffic and bivouac activities or from intentionally or accidental fire, or can be indirect, such as habitat degradation resulting from spread and introduction of non-native and invasive species or from increases in feral ungulate populations resulting from hunting exclusion and other forms of defacto habitat protection.

Wildfire records (1987 – 1999) show many fires associated with training in ranges 1, 8, 10, and 11. Also many fires are recorded in the impact area. Due to the difficulty accessing and managing fires within the impact area, I believe the total number of fires reported within the impact area to underestimate the total number that actually occur.

According to Army records reported in the Bilogical Assessment, Tracers are the largest cause of fires at PTA. (7-45). Because tracers are planned as an important part of Stryker training, it is reasonable to assume that there will be an increase in ignitions within all areas affected by Stryker live fire training.

Minimum fire fighting personnel and equipment resources identified in the Integrated Wildland Fire management Plan and Biological Assessment are inadequate. Of the 10 trained wildfire staff, only 6 are required to be on duty during any Stryker training exercise. One helicopter capable of conducting bucket operations must be on site and another could be available in no less that 90 minutes. Two of the 6 personnel can be range control personnel, leaving only 4 required by the fire department. If one of these persons is required to serve as Fire Dispatch and two are needed in each Hum-V brush engine, that leaves only one properly staffed Brush engine resource available to respond to any incident. Range control staff have other duties that take precenence over firefighting, including range dispatch, range safety, and coordination of operations, maintenance, and range operations. Multiple fires at one time or large incidents are obviously beyond the capability of these resources.

Wildfire Fuels Reduction measures are inadequate to control or contain he spread of fountain grass or effectively manage large fires. Existing compartments delineated by fuels management corridors are too large to be effective in managing fires. If a single fire reaches. and make no attempt to keep the grass-fire cycle from taking over and degrading native forest areas.

6. Stryker training exacerbates the fire-grass invasion cycle through adding disturbance factors that increase the risk of fire by promoting the increase in fine fuel loads through disturbance and weed spread, and providing an abundance of ignition sources. Active management of these two risk factor, as well as implementation of the Fire Danger Rating system that considers weather and fuels variables, are fundamental requirements of effectively managing wildfire throughout the year.

If starting fires through use of tracers, highly explosive munitions, illumination flares, and other means are realistic aspects of warfare and training need to simulate those realistic conditions as closely as possible, then the highly unique upland dry forest environment of Pohakuloa training Area is not the ideal site to train. The costs to the

natural resources, which are global treasures of endemic biological diversity, are too high.

Historically Range 11 T was used for Bradley tanks firing 105 mm rounds. We do not know what the effect on this activity was on the habitat because there are no records of what the vegetation was like, the type and number of native plants it supported, and what the incidence of training-related fire was during the time tanks were using the site.

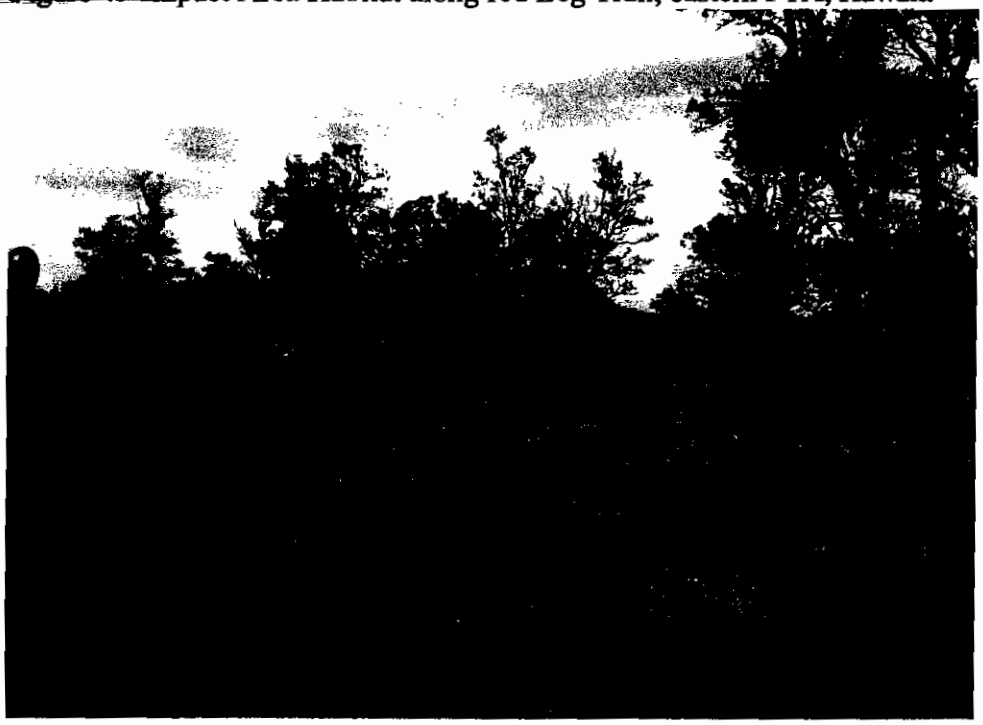
Under the proposed Stryker use, the Mobile Gun System will be firing ~~120~~ 105 mm explosive rounds at Range 11T. The increase of the use of direct gunnery, such as the mobile gun System, and mortars, may cause more direct impacts from explosion and fire ignition. In addition, due to the extended range capability of the weapon system, there may be an increase in the number of rounds to land outside of designated areas, thereby increasing the size of areas where impacts are likely to occur.

Furthermore, the invasive fountain grass is continuing to spread across the entire Pohakuloa Training Area and surrounding environments. Although its range during the time when tanks were being used at Range 11T is unrecorded, the rapid spread of the species over the past 15 years indicates that the abundance and total fuel load at range 11T, as throughout the rest of the installation, is likely to be substantially higher than anytime in the past. It is reasonable to expect the species to continue to spread across the installation, becoming more continuous and wide-spread, enabling more fire starts, rapid spread, and larger fire size. As fountain grass increases its distribution, the chance of large fires and severe impacts to ecosystems and listed species increase. This effect may be exacerbated by the addition of the Stryker vehicle and associated use of the Mobile Gun System (Figure 3).

Figure 3. View from Range 11T toward Impact Area. Range 10 and Puu Kailua in background at left. Fine fuel loading resulting from fountain grass invasion now carry fires over larger distances and between ranges.

In addition, Strykers will be maneuvering down range at range 8 and firing at targets as they approach them. This new type of use of range 8 will increase size of the area affected by the range's use, including nearby areas to the sides of the range that previously were not in the line of fire. The area affected by projectiles resulting from Stryker use is spread over a larger area resulting in a larger ignition zone surrounding the range. Coupled with continued fountain grass spread throughout this region (Figure 4), the potential for training related fires at Range 8 increases.

Figure 4. Impact Area Habitat along red Leg Trail, eastern PTA, Hawaii.



7. Secondary threats to native dryland ecosystems include competition with alien grasses for water and nutrients, browsing by feral sheep and goats, seed predation by rats, and habitat fragmentation from these factors. In addition, many of the habitat threat factors are interrelated or interdependent. Invasion by alien grass promotes fire, which kills natives and promotes resprouting, which nourishes feral ungulate herds, which browse in burn areas, which favors grass recovery over natives, which leads to high fuel loads that ignite easily and burn frequently. Traning provides the ignition source for the fires. Because these factors have interactions, it is incumbent upon the land manager to manage resource needs comprehensively, considering the entire set of factors affecting each resource and manage entire landscapes and native habitats that support species.

Other impacts include those resulting from dust (Figure 5). High wind events pick up loose soil and carry it over large distances.

Figure 5. Dust storm at PTA, 2002.